

Claims

What is claimed is:

1. A seal for a hydraulic cylinder rod, comprising:  
a main body defining an opening therein and including an inner surface, an outer surface, a first radial face having a generally planar surface extending from the inner surface to the outer surface, a second radial face extending from the inner surface to the outer surface and having a groove disposed therein, the groove defining an inner lip adjacent the inner surface and an outer lip adjacent the outer surface; and  
a relief feature disposed in the outer surface of the main body, the relief feature extending from the first radial face towards the second radial face.
2. The seal of claim 1, wherein the relief feature includes a channel formed in the outer surface and extending from the first radial face to a recess.
3. The seal of claim 2, wherein the recess has a circular shape.
4. The seal of claim 2, further including a second channel extending along the first radial face and connecting with said channel in the outer surface.
5. The seal of claim 1, further including a plurality of relief features disposed along the outer surface.
6. The seal of claim 1, wherein the main body has a substantially circular shape.
7. A hydraulic cylinder assembly, comprising:

a housing defining at least one chamber configured to hold a pressurized fluid, the housing having a head defining an opening;

a cylinder rod having a surface and disposed for sliding movement in the opening of the housing; and

a seal having a main body defining an opening configured to receive the cylinder rod therein, the main body including an inner surface, an outer surface, a first radial face having a generally planar surface extending from the inner surface to the outer surface, a second radial face extending from the inner surface to the outer surface and having a groove disposed therein, the groove defining an inner lip adjacent the inner surface and an outer lip adjacent the outer surface, the inner lip configured to engage the surface of the cylinder rod, the main body further including a relief feature disposed in the outer surface of the main body, the relief feature extending from the first radial face towards the second radial face.

8. The hydraulic cylinder assembly of claim 7, further including a second seal configured to engage the surface of the cylinder rod between the at least one chamber and the inner lip of said first seal and a third seal configured to engage the surface of the cylinder rod at a location where both the first and second seals are disposed between the at least one chamber and the third seal.

9. The hydraulic cylinder assembly of claim 8, wherein the housing includes a first annular groove configured to receive the first seal, a second annular groove configured to receive the second seal, and a third annular groove configured to receive the third seal.

10. The hydraulic cylinder assembly of claim 7, wherein the relief feature includes a channel formed in the outer surface and extending from the first radial face to a recess.

11. The hydraulic cylinder assembly of claim 10, wherein the recess has a circular shape.

12. The hydraulic cylinder assembly of claim 10, further including a second channel extending along the first radial face and connecting with said channel in the outer surface.

13. The hydraulic cylinder assembly of claim 7, further including a plurality of relief features disposed along the outer surface.

14. The hydraulic cylinder assembly of claim 7, wherein the main body has a substantially circular shape.

15. The hydraulic cylinder assembly of claim 8, wherein the second seal is a buffer seal.

16. The hydraulic cylinder assembly of claim 8, wherein the third seal is a wiper seal.